

**GOVERNMENT OF INDIA  
WATER RESOURCES  
LOK SABHA**

UNSTARRED QUESTION NO:1048  
ANSWERED ON:01.08.2005  
EVALUATION OF CADP  
Thakkar Smt. Jayaben B.

**Will the Minister of WATER RESOURCES be pleased to state:**

- (a) whether evaluation of Command Area Development Programme is being carried out by the Government;
- (b) if so, in how many States such evaluation has been carried out so far; and
- (c) the results of evaluation, State-wise/project-wise?

**Answer**

THE MINISTER OF STATE IN THE MINISTRY OF WATER RESOURCES (SHRI JAI PRAKASH NARAYAN YADAV)

- (a) Yes, Sir.
- (b) So far evaluation studies have been taken up by the Ministry of Water Resources in 53 projects of 18 States.
- (c) State-wise/project-wise results of evaluation studies are given in Annexure.

**ANNEXURE**

ANNEXURE REFERRED TO IN REPLY TO PART (C) OF THE UNSTARRED LOK SABHA QUESTION NO. 1048 BY SHRIMATI JAYABEN B. THAKKAR REGARDING "EVALUATION OF CADP" FOR ANSWER ON 01.08.2005.

**A. RESULTS OF EVALUATION STUDIES IN 16 PROJECT COMMANDS (1996):**

The objective of the studies was to evaluate the impact of Command Area Development Programme in respect of impact indicators such as utilization of Irrigation potential, increase in irrigation intensity and water use efficiencies, use of fertilizers and improved variety seeds, increase in agricultural productivity, increase in farm income etc., the summarized results of which are given below State-wise and Project-wise :

- 1. Andhra Pradesh
  - i) Nagarjuna sagar Project:

The specific impact of CAD is not clearly visible because of the problem of inequitable distribution of water, areas not getting irrigation and lower productivity in large areas is quite visible.

The environmental problem is mainly seen in terms of waterlogging due to impeded drainage and salinisation of area. Surveys have indicated that 61 villages out of 754 (8%) and around 90 villages out of 640 (50%) are affected by waterlogging.

**2. Assam:**

- i) Jamuna Project:

Area under Paddy increased from 86.44 per cent to 98.3 per cent. Area under Sali paddy cultivation increased from 47 per cent to 83 per cent. This shows that there has been reliability in supply of irrigation water. The farmers have also switched over to the cultivation of crops like Sugarcane, Mustard, wheat and pulses in certain areas which is reported to be a result of realization among farmers of benefits of scientific use of irrigation water and diversification of agriculture.

**3. Bihar**

- i) Kosi Project:

There has been a marked improvement in the area covered under different crops under CADA and productivity of pulses (both Kharief and Rabi), wheat and oil seeds but with a marginal fall in case of cereals.

In the pre-project conditions the command area was devastated by shifting course of river and flood ravage. Vast depressions were

left in the receding floods and communication, habitation etc. were totally disorganized. This entire area after the project has now become prosperous, green and lush with growth of population and habitations.

#### 4. Haryana

##### i) Jawahar Lal Nehru Lift Irrigation Project:

The annual projected intensity of irrigation is 62%. The actual intensity of irrigation on 98 outlets in Mohindergarh canal system ranged between 1% to 110%.

The actual area, which has been commissioned for irrigation was estimated as 170,000 ha CCA but it has been curtailed to 90,000 ha CCA on account of system deficiencies resulting into reduced flows.

Potential depends upon availability of water and not upon the extent of physical infrastructure alone. The actual available water is limited to about 15% of the projected allocation. Therefore, actual irrigated area is also in the same range vis a vis the projected area.

The assets of the farmers in terms of housing, durable assets, livestock, agricultural implements are more in the command areas vis a vis non command areas.

The family income per household is Rs 58530 in command and Rs 45145 in non command areas.

#### 5. Himachal Pradesh

##### i) Giri Project:

The data on season-wise, crop-wise irrigated area in left bank canal and right bank canal indicate that the intensity of irrigation in the left bank canal which was 58.6 per cent in 1985 (when CAD activity was taken up) increased to 71.7 per cent in 1992. In the case of right bank canal the intensity of irrigation increased from 87.1 per cent in 1985 to 127 per cent in 1992.

#### 6. Gujarat

##### i) Bhadar Project:

Modernisation of the canals has improved the water use efficiency. The conjunctive utilisation of ground water has also helped. Introduction of warabandi and formation of water users, cooperative societies are very essential for further improvement.

The irrigation potential utilised was 11430 ha in 1983-84 when the CAD Programme was started in the project area against the created potential of 17170 (67% utilisation). This had increased to 14050 in 1993-94 (82% utilisation).

##### ii) Dharoi Project:

Due to implementation of CAD programme irrigation facilities improved and production increased. However, a lot of improvement is required in planning stage and thereafter in the execution of the system.

Field drains were executed only on demand from beneficiaries. Non-provision of field drains had damaged culturable areas. Government policy needed a change for construction of field drains at a government cost.

Warabandi was needed to be implemented in the system, which is a must for operation of irrigation.

State Government was required to take immediate action for implementation of cooperative water management by formation of WUAs.

Extension programmes for farmers were required to be undertaken.

#### 7. Karnataka

##### i) Malprabha Project:

After 20 years after completion of the dam and 30 year after the commissioning of the project only 72% irrigation potential has been created. The progress in utilisation is worse. During last two years, utilisation percentage is 70. In the preceding 6 years it was less than 50%. Only one year it reached 86.4%

(1982-83)

Although land levelling helps in uniform water application, less water use and increase in crop production, the progress has been only 56000 ha in 20 years that is 37% of the target

(134916 ha.)

The progress of field irrigation channels was satisfactory but maintenance was poor.

The cropping pattern has developed as planned in the project namely 40% Kharief + 20% cotton +40% Rabi

## 8. Maharashtra

### i) Surya project:

The project was included in CAD programme in 1983-84. Out of a CCA of 14696 ha. only an area of 8 ha. was covered with field channel and out of 1000 ha. of PVC pipe distribution system only 715 ha. were covered which have not been judged for its performance. Out of this hardly 50% area has been irrigated and at some places pipes have been choked or damaged.

Very little work was done under the CAD programme and it was considered insignificant for any impact analysis.

Farmers wanted field channel to be constructed for efficient use of water. Warabandi also needed to be introduced in the commands.

It was considered desirable to establish a training Institute for farmers in the commands for teaching them improved technology for paddy cultivations and flouriculture and then horticulture pest control etc.

### ii) Kukadi Project:

Utilisation of irrigation potential increased to 43% in 1988 as compared to zero in 1977.

Field channels and field drains had been completed in 74099 ha. and 52,943 ha. (up to 1993-94) out of a CCA of 2,24,699 ha. Warabandi had been introduced in 35889 ha.

Irrigation intensity increased from 70% (pre-CAD) to 180% (Post-CAD).

## 9. Madhya Pradesh

### i) Barna Project:

The rabi irrigation has developed more or less as planned and reached 34482 ha (1993-94).

The yield per ha principal crops in the command for the last one decade has increased substantially. promotion of soybean although mainly rain fed has been facilitated by the work of CADA staff in a large way.

There has been increase in farm income. This could have been better but for the prevailing sharecropping system through tenants. there is an upward trend double cropping and switch over to high yielding variety crops.

### ii) Hasdeo Project:

In Bilaspur district of the project the consumption of fertilizers was 48.5 kg/ha during 1990-91. This was much higher than the average consumption for the whole of Bilaspur District which was 13.1 kg/ha for the same period.

## 10. Rajasthan

### i) Chambal Project:

Analysis of four years' data (1991-92 to 1994-95) of irrigation potential created and utilised for the Project indicates that there has been full utilisation of irrigation potential for almost all the four years.

Implementation of the Programme has led to an increase in the intensity of irrigation from the designed 89 per cent to 118 per cent (achieved) in 1995-96.

The quantum of water use per hectare in the project has steadily declined between 1974-75 and 1995-96, which shows that there has been efficient use of irrigation water in the region. The designed delta of the project is 0.689 mts. In 1991-92 the delta achieved was 0.729 mts. But due to efficient utilisation of water under CAD Programme, the delta achieved in 1994-95 was

0.649 mts. thereby indicating the increase in water use efficiency by 12.4 per cent over the period.

A significant change in the cropping pattern has been noticed. Area under Oil seeds which are water use efficient crops, has increased from 6.96 per cent in 1973-74 to 49.01 per cent in 1993-94.

During the period 1973-74 to 1994-95 agriculture production had increased from 2,26,920 tonnes to 6,77,170 tonnes which showed an increase by 198 per cent. The agriculture productivity per ha had increased from 1547 kg/ha to 2803 kg/ha during the same period.

Due to increase in cropping intensity and timely availability of water, the average fertilizer consumption had increased from 37.99 kg/ha in 1975-76 to 124.13 kg/ha in 1994-95. Total area under high yielding variety seeds in the project area had increased by 15 per cent during 1991-92 to 1994-95, whereas at the State level there had been only 2.5 per cent in the same period.

The collective impact of increase in the irrigated area and production of oil seeds had led to an increase in agricultural productivity

and net farm income in the Chambal Project command. The percentage increase in net farm income came to 76 per cent in 1994-95 over 1973-74.

In the Command Area, drainage had helped in reducing waterlogged areas in the command from 1,67,000 ha in 1973 to 99,000 ha in 1994.

## 11. Uttar Pradesh

### i) Sharda Canal System:

As a result of better water distribution facility through the CAD Programme, area under major crops has increased. Areas under paddy and wheat have increased by 32.2 per cent and 14.5 per cent respectively in 1993-94 over 1987-88. Area under oil seeds has increased by 73 per cent in 1993-94 over 1987-88 while the area under rain fed crops like Jowar, Barley, Gram and Arhar has gone down by 18-44 per cent during the same period.

Food grains production in the project command had increased by 80-88 per cent in case of Kharif crops and by 25-30 per cent in case of Rabi crops in 1993-94 over 1987-88. Productivity of major crops, like paddy had gone up by 32.5% in 1993-94 over 1987-88 while in case of wheat and sugarcane it has increased by 15-16%. Productivity of Rice in the Command was about 4 Qts/ha higher (1993-94) than the average productivity in nearby districts presently not covered under CAD Programme. Cropping intensity in the command had reached the level of 149 per cent in 1992-93 which is an increase of 9 per cent over 1987-88 whereas at the State level the intensity had gone up by 4 per cent only during the same period.

Because of a shift in the cropping pattern from rain-fed crops to irrigated crops and better distribution of water, consumption of fertilisers had increased by 58 per cent in 1994-95 over 1987-88.

## 12. Tamil Nadu

### i) Periyar Vaigai Project:

The irrigated area which was 48933 ha in 1982-83 had increased to 95406 ha in 1992-93 showing a n appreciable increase in utilisation of irrigation potential i.e. from 84 per cent to 124 per cent.

The rate of consumption of water per th. ha. has improved considerably. Against 7.27 cubic metre water per thousand ha. planned, the rate of consumption of water has been economic and in many of the cases upto 4.17 cubic metre water per thousand ha. The duty of water, which was 3.6 ha per m.cu.ft. in no rotational water supply area has increased to 4.13 ha per m.cu.ft.

The average yield of paddy, which was 2516 kg per ha before the introduction of rotational water supply (1982-83), had increased to 5525 kg per ha (1992-93) which is an increase of 119 %.

Because of conjunctive use of water from a storage of 2100 small tanks and 7052 dug wells in the command area. On account of this, the water table has been kept under check, well below the ground level. This has reduced the incidence of waterlogging, soil salinity and alkalinity in the area.

## B. RESULTS OF COMPREHENSIVE EVALUATION STUDY IN 10 PROJECT COMMANDS (1997):

The objective of the study was to assess the impact of the programme in bridging the gap between irrigation potential created and utilised, increase in agricultural productivity and production, increase in the income of the farmers etc. summarized results of which are given below.

### 1. Rajasthan

#### i) Chambal Project:

Informal warabandi was introduced in 114782 ha out of CCA of 229000 ha since 1974 up to 1995-96. Farmers in general appreciated the merit of warabandi.

Maximum utilization of irrigation potential created increased by 39.5 % from 71.7 % (in 1974-75) to 111.2 % (in 1992-93).

Productivity of paddy, sorghum, wheat and gram increased at the compound rate of 2.1 %, 5.7 %, 5.2 % and 4.7 % respectively from pre-CAD year 1974-75 to post-CAD year (1995-96).

Irrigation intensity increased from 69.26 % prior to CAD (1974-75) to 108.88 % in 1994-95.

The water does reach up to the tails.

Overall family annual income was Rs.54044 in command area of the project as against Rs.39394 in non-command area.

### 2. Madhya Pradesh

#### i) Hasdeo:

Warabandi was started in 1995-96 and was achieved in 2154 ha only by end of that year. However, due to construction of field channels, farmers were cooperating with each other for distribution of water among themselves.

Maximum utilization of irrigation potential created increased by 10 % from 99 % (in 1974-75) to 109 % (in 1994-95).

### 3. Orissa

#### i) Hirakud :

Improved irrigation practice led to increase in grain yield of rice by 16 %.

Water use efficiency increased by 49 %.

### 4. Andhra Pradesh

#### i) Sriram Sagar:

Warabandi system was designed to provide secured and timely supply of irrigation to all farmers in the outlet commands. From 1979-80 to 1984-85, warabandi was implemented in an area of 78376 ha out of CCA of 6,51,000 ha. While introducing warabandi system, informal pipe committees were formed which worked well for the first three years but gradually became defunct due to deterioration of the maintenance of the system.

Maximum utilization of irrigation potential created increased by 42.9 % from 34.5 % (in 1974-75) to 77.4 % (in 1987-88).

### 5. Tamil Nadu

#### i) Periyar Vaigai:

Warabandi was achieved in 58213 ha out of CCA of 78357 ha by 1992-93.

Maximum utilization of irrigation potential created increased by 17.5 % from 107.1 % (in 1974-75) to 124.6 % (in 1990-91).

Beneficiaries in head, middle and tail reaches received water as per schedule.

Households having income above Rs.30000 increased from 92 % (Pre-CAD) to 95 % (post-CAD).

Total water logged and salt affected area reduced to 6359 ha in 1990 from 7697 ha in 1986-87. It further reduced to 4539 ha in 1995.

### 6. West Bengal

#### i) DVC :

Maximum utilization of irrigation potential created decreased by 2.3 % from 91 % (in 1974-75) to 88.7 % (in 1995-96).

### 7. Gujarat

#### i) Hathmati :

Maximum utilization of irrigation potential created increased by 1.9 % from 57.7 % (in 1983-84) to 59.6 % (in 1984-85).

### 8. Kerala

#### i) Malampuzha :

Warabandi in the full CCA (21732 ha) was achieved in 1995-96. Under warabandi, Kerala was constructing pucca structures at the head of the spout. Farmer Beneficiaries Associations were themselves managing the distribution of water and tail enders were getting water.

Maximum utilization of irrigation potential created increased from 78.1 % (in 1974-75) to 91 % (in 1995-96).

### 9. Karnataka

#### i) Ghataprabha :

Maximum utilization of irrigation potential created increased by 34.3 % from 63.1 % (in 1974-75) to 97.4 % (in 1992-93).

### 10. Uttar Pradesh

#### i) Sarda Canal :

Maximum utilization of irrigation potential created increased by 3.7 % from 73 % (in 1974-75) to 76.7 % (in 1991-92). Warabandi was achieved in an area of 6,04,103 ha out of CCA of 16,13,000 ha up to 1995-96. It was found that water was reaching in entire command after construction of the field channel through informal arrangement.

There was increase in the yields of rice, wheat and sugarcane by 40, 44 and 45 percent respectively.

### C. RESULTS OF EVALUATION STUDIES DONE THROUGH REMOTE SENSING (2004 -2005):

The objective of the study was to estimate total irrigated area under major crops, estimate crop productivity, identify poorly performing canals and identify the trend / extent of water logging and salt affected soils. The summarized results of the studies are as under :

#### 1. Andhra Pradesh

##### i) Jamuna Nagarjuna Sagar (LBC) Project:

There was 20% rise in total crop area during the period from 1990-91 to 1998-99.

Paddy is the main crop while cotton and chilies are two other important crops grown in the command. Area covered under cotton was found to be 2.6 times that of chilly during the period from 1990-91 to 1998-99.

There was 13% increase in Irrigation Intensity during the period from 1990-91 to 1998-99. Rise in yield of rabi paddy of about 5.5qtls per ha during the period from 1990-91 to 1998-99.

An area of 49777 ha was affected due to salinity/alkalinity problem and an area of 696 ha was affected due to water logging.

##### ii) Sriram Sagar Project:

There was 280% rise in total crop area during the period 1985- 86 to 1998-99 and 13.4% rise in area of paddy during the period 1985-86 to 1998-99.

The area under known paddy crops such as maize, cotton, sunflower and others has been increased by more than two times from 1986 to 1999.

There was 48% rise in cropping intensity during the period from 1986 to 1999.

An estimated 6562 ha. of land confined mostly to Kakatiya and Lower Manair canal command in Warangal district was affected from soil salinity and / or sodicity.

Water logging was serious problem in Karim Ganj district. The extent of areas affected by water logging was estimated to be 18926 ha.

##### iii) Nagarjuna Sagar (RBC) Project:

Cotton is the predominant standing crop during rabi season followed by paddy, groundnut and black gram .Area under paddy increased from 3% to 10% of the total crop area during the period from 1990-91 to 1998-99.

About 2% decrease in salt affected soils and water logged area were observed during the period from 1990-91 to 1998-99.

Practice of Aquaculture was observed in down-stream region of the command.

#### 2. Assam

##### i) Jamuna Project:

100% increase in crop area in 1990-91 compared to other two projects

29% increase in Paddy (crop during 10 years time period)

Decrease in percentage area under summer crops from 53% to 24% from 1986-87 to 1997-98 About 20% available ground water resources is utilized at present. Conjunctive use of ground water may be emphasized for increasing irrigation intensity.

No problem of salinity and alkalinity is observed

Extent of water level is insignificant and negligible in the command area. However, no line lands and poorly drain lands are prone to water logging and precaution has to be exercised in deciding cropping pattern in these areas.

#### 3. Maharashtra

##### i) Krishna Project:

There was 13.5 % rise in total cropped area and 9.73 % rise in cropping intensity during 1988-89 to 1998-99. No water logging, salinity and alkalinity problem was observed in the project command.

#### ii) Upper Tapi Project:

There was 230% rise in crop area during the period from 1988-89 to 1997-98 were observed. Cropping pattern has also changed from Rain fed Jowar to commercial crop like cotton, perennial crop and wheat from 1988- 89 to 1997-98.

There was no symptom of development of salinity, alkalinity, water logging within the command.

#### iii) Bhima Project:

There was 7.3% increase in total crop area and 3% rise in cropping intensity were observed during the period from 1988-89 to 1997-98.

The total salt affected and waterlogged areas in the command were estimated to be 470 ha. and 405 ha. respectively

#### iv) Purna Project:

Total irrigated area increased during rabi and summer crop season from 22,674 ha (1986-87) to 44,121 ha (1990-91) and 28,596 ha (1997-98). Irrigated area in 1990-91 represents a good performance at the command level in terms of full utilization of potential created. The irrigation utilization during rabi and summer crop season together observed to be highly variable with 39.1% in 1986-87 to 49% in 1997-98.

The problem of water logging and salinity / sodicity was less. An area of 85 ha. of salt affected soils and 345 ha. of water logging areas were identified in the command.

#### v) Jayakwadi and Majalgaon:

Cropping intensity had gradually increased in Jayakwadi Command whereas it had decreased in Majalgaon Command from 60% to about 50% (from 1986-87 to 1997-98).

Water logging in the command was found to be confined mostly near the main canal and in some places near distributaries and minors. The extent of waterlogged and salt affected soil areas in the command were as estimated to be 871.9 ha and 856.71 ha. respectively.

#### vi) Girna:

Irrigation Utilization (IU) in this command is mainly during rabi and hot weather season. Estimated IU during rabi and hot weather season together appears to have stabilised at close to the designed IU ( i.e. 54.08% of Irrigated Command Area)

Yield of wheat crop has improved significantly from 1988-89 to 1998-99.

The salt affected soils is found to be confined generally to deep and moderately deep black soil in the command and is estimated to occupy an area of 22398 ha.

There is no incidence of water logging in the command.

### 4. Rajasthan

#### i) Chambal Project:

There was 13% rise in total crop area and 10% rise in cropping intensity of wheat crop during the period from 1986-87 to 1997-98 were observed.

The wheat crop condition was observed to be uniform among the canal distributory. About 11152 ha of salt affected soils were estimated to occur in the Chambal irrigation command.

No regular trend in the extent of waterlogged areas was observed. However, the total area under water logging during the period 1990-91 was estimated to be 15191 ha. which is found to be more than that of reported estimate during 1986-87 at 9945 ha.

### 5. West Bengal

#### i) Damodar Valley Corporation (DVC) Project:

There was 70% rise in summer season crop area, 52% rises in area of boro- paddy cultivation, 35% rise in crop intensity were observed during the period from 1988-89 to 1997-98.

Productivity of boro paddy crop increased from 39.4 quintal per ha to 46.87 quintal per ha during the same period

ii) Kangsabati :

Culturable Command Area utilized maximum only for Kharief season.

In rabi/ summer crop season hardly one third of the total CCA was cultivated. Potato alone accounts for about half of the area under rabi crop. Significant shift from potato to summer paddy was observed during the period from 1988-89 to 1997-98.

Crop condition was observed to be consistently average during the period from 1988-89 to 1997-98.

Marginal increase in the total water logged areas and no soil salinity and alkalinity problem were observed during the period from 1988-89 to 1997-98.

iii) Mayurakshi Project:

36% rise in total crop area, 11.2 % rises in cropping intensity were observed during the period from 1988-89 to 1998-99.

Average paddy yield found to vary between 40-60 quintal per ha.

No salinity/alkalinity problem was observed in this command.

#### D. ON-GOING EVALUATION STUDIES

The evaluation studies of following projects are ongoing , out which the study of Tungbhadra project has been recently completed and salient findings of the same have been given :

1. Gujarat - Karjan project
2. Himachal Pradesh - Bhabour Saheb Phase-II project
3. Jammu & Kashmir -Ravi project
4. Kerala - Chalakudi project
5. Madhya Pradesh -Upper Weinganga project
6. Maharashtra -Bhima project
- 7 Manipur -Loktak project
8. Orissa - Mahanadi Delta (old) project
9. Punjab -Sirhind Feeder project
10. Rajasthan- IGNP-I project
11. Bihar - Sone project
12. Karnataka -Tungabhadra project (Recently completed)
13. Uttar Pradesh -Upper Ganga Canal project
14. Haryana -Western Jamuna Canal-II project

Salient findings of Tungabhadra project in Karnataka:

The irrigated area increased from 297761 ha to 348441ha during 11981-82 to 2000-01

The cropping pattern has been tilted towards growing of wet crop i.e. paddy. The Kharif paddy was planned to be grown in 29032 ha. but it has increased to 13562 ha. The area under kharief paddy has thus increased by 467% during 1981-82 to 2001

The irrigation intensity has increased from 41% to 65 during 1976-77 to 1997-98

The water logging, soil salinity and alkalinity are serious problems under Tunghbadra project area. The main reason of this situation is assigned to growing of paddy crop in 60-70% in Kharief while it was planned around 8% of CCA.